

AMENDMENTS TO THE CLAIMS

Upon entry of the present amendment, the status of the claims will be as shown below. This listing of claims replaces all previous versions and listings of the claims in the present application.

Listing of Claims

1. (Currently Amended) A light emitting device using an LED chip, comprising:
a mounting substrate having a recess and having a wiring portion that supplies electric power to the LED chip, the LED chip being mounted on a bottom of the recess;
a sheet-like wavelength converter disposed so as to cover the recess and an edge area around the recess and that is excited by light emitted from the LED chip to emit light of a wavelength different from an excitation wavelength; and
an emission controller provided at a light output side of the sheet-like wavelength converter so as to allow emission of light coming from an area of the sheet-like wavelength converter that corresponds to the recess and to prevent emission of light coming from an area of the sheet-like wavelength converter that corresponds to the edge area around the recess.
2. (Currently Amended) The light emitting device according to claim 1,
wherein the emission controller comprises an optical member disposed at a light output side of the sheet-like wavelength converter and having a light input portion facing the light output side of the sheet-like wavelength converter, the light input portion of the optical member having a recessed space such that an opening of the light input portion has substantially a same shape as an opening of the recess in the mounting substrate.

3. (Currently Amended) The light emitting device according to claim 1,

wherein the emission controller comprises a light blocking frame member disposed on a light output side of the sheet-like wavelength converter at a location corresponding to the edge area around the recess, the light blocking frame member having an opening of substantially a same shape as the opening of the recess.

4. (Currently Amended) The light emitting device according to claim 3,

wherein the sheet-like wavelength converter comprises a material with a high elasticity, an outer edge area of the wavelength converter being compressed by the light blocking frame member pressed against the sheet-like wavelength converter.

5. (Currently Amended) The light emitting device according to claim 1,

wherein the light output side of the sheet-like wavelength converter is convex.

6. (Currently Amended) The light emitting device according to claim 1,

wherein a density of a wavelength converting material in the sheet-like wavelength converter increases toward a center of the sheet-like wavelength converter.

7. (Previously Presented) The light emitting device according to claim 1,

wherein the emission controller comprises a lens disposed over the mounting substrate to have an optical axis coinciding with an optical axis of the LED chip, and

wherein the light emitting device further comprises:

a wiring board having a wiring portion fixed to the mounting substrate to supply electric power to the LED chip; and

a lens holder that positions and fixes the lens on the wiring board,

wherein a portion of the lens holder fixed to the wiring board is located inside as compared with an outer diameter of the lens.

8. (Original) The light emitting device according to claim 7, wherein the lens holder is tapered toward the mounting substrate.

9. (Previously Presented) The light emitting device according to claim 7, wherein the lens comprises a hybrid lens.

10. (Previously Presented) The light emitting device according to claim 7, wherein one of a top face and a side face of the mounting substrate is fitted to the lens holder.

11. (Previously Presented) The light emitting device according to claim 7, wherein the lens holder is engaged in one of grooves and through holes formed in the wiring board.

12. (Previously Presented) The light emitting device according to claim 11, wherein the mounting substrate and the lens are positioned and fixed on the wiring board via a same fixer.

13. (Previously Presented) The light emitting device according to claim 12, further comprising:

a metal foil for soldering that is provided on an under surface of a fixed portion of the lens holder;

a land that has substantially a same shape as the fixed portion of the lens holder and that is formed on the wiring board;

a lead electrode provided on the mounting substrate to be connected to the wiring portion of the wiring board; and

a wiring land that has substantially a same shape as the lead electrode and that is formed on the wiring portion of the wiring board,

wherein the metal foil and the land, and the lead electrode and the wiring land are connected to each other by soldering, respectively.

14. (Previously Presented) The light emitting device according to claim 12,

wherein a protrusion formed on the under surface of the lens holder is engaged in one of a through hole and a groove formed in the wiring board, and

wherein a protrusion formed on an under surface of the mounting substrate is engaged in one of the through hole and the groove formed in the wiring board.

15. (Previously Presented) The light emitting device according to claim 1, further comprising:

a light extraction increasing portion provided on a light output side of the LED chip to increase efficiency of extraction of light from the LED chip by being combined with the LED chip; and

a sealing resin that fills the recess in the mounting substrate where the LED chip is mounted to seal the recess,

wherein a top of the light extraction increasing portion is located higher than a top of a wall of the recess.

16. (Original) The light emitting device according to claim 15, wherein the mounting substrate has a second recess around the recess so that the resin can flow into the second recess.

17. (Previously Presented) A light emitting device using an LED chip, comprising:
a mounting substrate having a recess and having a wiring portion that supplies electric power to the LED chip, the LED chip being mounted on a bottom of the recess;

a wavelength converter disposed so as to cover the recess and an edge area around the recess and that is excited by light emitted from the LED chip to emit light of a wavelength different from an excitation wavelength; and

an emission controller provided at a light output side of the wavelength converter so as to allow emission of light coming from an area of the wavelength converter that corresponds to the

recess and to prevent emission of light coming from an area of the wavelength converter that corresponds to the edge area around the recess,

wherein the wavelength converter has a cross section that is convex at the light output side, such that light paths having different observation angles are substantially equal in length.

18. (Previously Presented) A light emitting device using an LED chip, comprising:

a mounting substrate having a recess and having a wiring portion that supplies electric power to the LED chip, the LED chip being mounted on a bottom of the recess;

a wavelength converter disposed so as to cover the recess and an edge area around the recess and that is excited by light emitted from the LED chip to emit light of a wavelength different from an excitation wavelength; and

an emission controller provided at a light output side of the wavelength converter so as to allow emission of light coming from an area of the wavelength converter that corresponds to the recess and to prevent emission of light coming from an area of the wavelength converter that corresponds to the edge area around the recess,

wherein a density of a wavelength converting material in the wavelength converter increases toward a center of the wavelength converter reducing observation angle variations of color and intensity of light.